SUBSTITUTE SPECIFICATION

APPARATUS, METHOD AND PROGRAM FOR SUPPORTING
A REVIEW

BACKGROUND OF THE INVENTION

The present invention relates to apparatus, method and program for supporting review of materials (documents or the like) and more particularly to apparatus, method and program for efficiently performing a series of work operations such as review, minutes preparation, pending issue management, and correction of review documents.

JP-A-7-146860 discloses that pieces of information for review of a designated document by a plurality of reviewers are taken out in accordance with a display command so that, on the basis of position information in these pieces of review information, a corresponding display position in original document displayed on the screen may be determined to make a display area vacant and the review information may be displayed in the vacant display area, and that it is commanded whether the review information by the plural reviewers displayed on the original document in correspondence with the reviewers is adoptable or non-adoptable and the display form is

changed in accordance with the adoption or non-adoption so that only review contents commanded as being adoptable may be extracted to correct the original document in accordance with the review information.

JP-A-6-274493 discloses a document management apparatus in which a plurality of document review processors used by a plurality of document review members to perform review work are mutually connected through a network, one of the plurality of document review processors is defined as a server having a common comment database prepared and used in review work, the server and the plural document review processors constituting the document management apparatus, wherein each of the plurality of document review processors includes review member managing means for managing access to the database of the server from review members cooperatively participating in work of reviewing individual review object documents, means for enabling an examinatorial reader to prepare comments necessary for review, answer preparing means for enabling an answerer to make a response to a comment, comment searching means for searching only a necessary comment from a large amount of comment data, comment display means for adjusting retrieved results and displaying them, comment managing

means for managing comments prepared by a plurality of examinatorial readers and data of answers prepared by a plurality of answerers and for printing review results, and review notifying means for managing forwarding of various notice documents necessary for adjusting the work between the review members.

In review, obscurities in a review object document and a solution thereagainst must be clarified. In addition, a series of work operations of putting together the review results in a minutes and a pending issue list and eventually correcting the review object document must be fulfilled.

The aforementioned prior arts, however, fail to describe that a system (application) for editing an object document into which comments are to be inserted differs from a system (application) for displaying and editing the comments collectively. Further, none of the aforementioned prior arts disclose a plurality of object documents prepared by different systems (applications).

Further, in the JP-A-7-146860, review information can be post-scribed in a specified range in a review document but the review information is information for document substitution by which adoption or non-adoption of the review document is determined.

With the JP-A-6-274493, when such work as examinatorial read request, examinatorial read completion, answer request and answer completion is carried out through mail notification, interchange of mails is necessary for a participant to prosecute examinatorial read work. Accordingly, for performing examinatorial read, at least four mail interchange operations of examinatorial read request, examinatorial read completion, answer request and answer completion are necessary. In other words, a considerable amount of work operations are needed for examinatorial read. Further, much time is lost in interchange of mails. In addition, to respond to a comment, a review reader selects an answerer and forwards a mail to the answerer. In failure to obtain any answer, work for reselecting another answerer is needed and expectantly, re-work operations will be done many times.

SUMMARY OF THE INVENTION

An object of the invention is to provide review support apparatus, method and program capable of allowing a user to perform review efficiently and improving the quality of review documents.

According to one feature of the

invention, a position attribute management table is provided which is adapted for collectively managing different pieces of position information in order to cooperate different systems (applications). The position attribute management table can define what acquisition items (attributes) the information of a position at which a comment is filled in is expressed by, in respect of individual applications (individual document classes). By changing this definition, various kinds of applications can be dealt with. Then, a position information acquiring unit consults the position attribute management table to acquire the position information defined as a comment position attribute and stores the position information in a comment-solution management table to manage it.

According to the present invention, the user can carry out review efficiently and the quality of a review object material can be improved.

Other objects, features and advantages of the invention will become apparent from the following description of the embodiments of the invention taken in conjunction with the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 shows the configuration of an apparatus according to a first embodiment of the invention.

Fig. 2 shows display screens in the present invention.

Fig. 3 shows a position attribute management table 115.

Fig. 4 shows a comment-solution management table 116.

Fig. 5 shows the flow of a process for displaying a comment post-scribed in a review document 202 on a review document editing screen 201.

Fig. 6 shows transition of the display screen for post-scribing comments in the review document 202.

Fig. 7 shows the flow of a process for reflecting a comment post-scribed in the review document 202 upon minutes 210.

Fig. 8 shows the flow of a process for selecting a comment in the minutes 210 and emphatically displaying a corresponding comment range and the comment in the review object document 202.

Fig. 9 shows the flow of a process for selecting a comment range in the review document 202 and emphatically displaying a corresponding comment in the minutes 210.

Fig. 10 shows the flow of a process

for displaying a solution described in the minutes 210 while correlating it to the review document 202.

Fig. 11 shows the flow of a process for displaying a solution described in a pending issue list 218 while correlating it to the review document 202.

Fig. 12 shows the flow of a process for selecting a solution in the pending issue list 218 and emphatically displaying a corresponding comment range in the review document 202.

Fig. 13 shows the flow of a process for selecting a comment range in the review document 202 and emphatically displaying a corresponding solution in the pending issue list 218.

Fig. 14 shows the flow of a process for selecting a comment in the minutes 210 and emphatically displaying a corresponding solution in the pending issue list 218.

Fig. 15 shows the construction of an apparatus according to a second embodiment of the invention.

Fig. 16 shows a difference management table 1503 in the invention.

Fig. 17 shows the flow of a process for managing the difference.

Fig. 18 shows the flow of reviewing

in the invention.

Fig. 19 shows the construction of an apparatus according to a third embodiment of the invention.

Fig. 20 shows the flow of a process for reflecting comments form a plurality of reviewers upon the minutes 210 in the invention.

Fig. 21 shows the concept of merging the comments from the plural viewers to the review document 202 in the invention.

Fig. 22 shows the construction of an apparatus according to a fourth embodiment of the invention.

Fig. 23 shows an instruction 2301 in the invention.

Fig. 24 shows an instruction 2401 in the invention.

Fig. 25 shows the flow of a process for generating the instruction 2401 in the invention.

Fig. 26 shows the flow of a process for analyzing the instruction 2401 in the invention.

DETAILED DESCRIPTION OF THE EMBODIMENTS OF THE
INVENTION

The present invention will now be
described by way of example with reference to
the accompanying drawings.

In order to integrate different
systems, there needs a scheme capable of
separately acquiring position information the
individual applications manage internally.
With the aid of only an address of a document,
it is impossible to decide where comments are
added and besides the individual applications
typically have position information in
different ways, giving rise to the necessity of
a scheme capable of collectively managing
different pieces of position information for
the purpose of performing cooperation.
Accordingly, in the present invention, a
position attribute management table is prepared.
The position attribute management table can
give a definition as to what attributes are
used in respect of individual applications
(individual document classes) to express the
position information (range) in which comments
are to be written. By changing the definition,
a variety of applications can be dealt with.
Then, a position information acquiring unit
consults the position attribute management
table to acquire position information defined

as a comment position attribute and records the position information on a comment-solution management table to manage it. As described above, by managing the position through the use of two tables of position attribute management table and comment-solution table, pieces of information of different systems can be acquired/operated at a time. Accordingly, even review object materials prepared by different applications can be cooperated with a review support apparatus by merely defining attributes of position information in a position attribute definition table. Further, the number of applications to be cooperated concurrently is not limited.

Referring to Fig. 1, an apparatus according to a first embodiment of the invention is constructed as shown therein in block diagram form. An information processing apparatus (computer) comprises a processor 100 (for example, a CPU or the like) for executing individual processes (individual steps) in accordance with a program, an input unit 102 (for example, a keyboard, mouse or the like) for receiving an input from a user and transmitting its input information to the processor 100, a display unit 103 for visually displaying display information from the processor 100, and a resultant DB 104 (for

example, a hard disk) for accumulating s review

object document or the like. The processor 100

includes a review object document editor 219

for editing a review object document, a minutes

editor 220 for editing a minutes, a pending

issue list editor 221 for editing a pending

issue list, and a review support processor 101

for supporting review. The review support

processor 101 has an input processing unit 105

for fetching input information from the input

unit 102, a position information acquiring unit

106 for acquiring a position in a review object

composition, a search unit 107, a reflecting

unit 108 and a display processing unit 109 for

controlling the screen on which an object to be

edited is displayed. Each of the above-

mentioned units is implemented as the processor

100 operates in accordance with a program. The

display processing unit 109 can also permit a

plurality of display units 103 to be used as

picture display screens. The resultant DB 104

centrally manages a review object document 202,

minutes 210 adapted to put together comments

(for example, comments and solutions) on a

composition in the review object document 202,

a pending issue list 218 adapted to manage

outstanding items or pending issues in the

minutes 210, a position attribute management

table 115 for defining items to be acquired as

position information, and a comment-solution
management table 116 adapted to put together
solutions against comments. The review
document editor 219', minutes editor 220',
pending issue list editor 221' and review
support processor 101 may be either the same
application or different applications.

Referring to Fig. 2, pictures as
displayed on screens are shown according to the
first embodiment of the invention. A review
object document editing screen 201 is a display
screen of a subsystem for editing the review
object document 202. A minutes editing screen
209 is a display screen of a system for editing
the minutes 210. A pending issue list editing
screen 217 is a display screen of a subsystem
for editing the pending issue list 218. When
recognizing that, for example, a composition in
the review object document 202 is irrational, a
user (reviewer) writes a comment 205 in the
composition at a position (for example, comment
range 203). The range in which the comment 205
can be post-scribed is a composition, a table,
a figure or the like in the review object
document 202. The position information
acquiring unit 106 manages the comment range
203 by using attributes shown in the position
attribute management table 115. The display
processing unit 109 generates these screens.

Turning to Fig. 3, the position
attribute management table 115 for defining
position information in the first embodiment of
the invention is configured as shown therein.
Type 301 represents a column for describing
type definitions of an attribute set used for
expressing position information, that is, a
column for describing acquisition items of
position information in the review object.
Classification A 302 is a column for describing
the class of an application used during
preparation of the review object document 202.
For example, a word processor, a graphic
application or the like sorted into this class.
Classification B 303 is a column for describing
the class of an object prepared by utilizing
the classification A 302. For example, a
composition, a figure, a table or the like is
sorted into this class. In the classification
B 303, "comment" or "solution" to be described
later can also be designated. By defining the
type 301 in respect of each of the
classification A 302 and classification B 303
in this manner, position information having
various units can be expressed. Also, when
defining the type 301 through the medium of the
input unit 102, the user can freely select an
application for editing the review object
document 202. Attribute A 304, attribute B 305,

attribute C 306, attribute D 307, attribute E
308 and attribute F 309 are columns for
describing attributes serving as actual
position information in accordance with the
definition of type. For example, a type
definition 310 having a value of "text" in type
301 connects to "composition" in classification
A 302 to indicate that this is prepared with a
word processor and then to "text" in
classification B 303 to indicate that the range
of designation is a text. Through this, the
unit indicating the position information is
determined and a start page is described in
attribute A 304, a start line is described in
attribute B 305, a start column is described in
attribute C 306, an end page is described in
attribute D 307, an end line is described in
attribute E 308 and an end column is described
in attribute F 309. By utilizing the "type" of
position information, the review object
document 202 can be correlated to a comment.
Pieces of information as to how the review
object document 202 is correlated to comments
are put together in the comment-solution table
116. The position attribute management table
115 is defined in advance by the user and
stored in the resultant DB 104.

Referring now to Fig. 4, the comment-
solution management table 116 in the first

embodiment of the invention is structured as
shown therein. ID 401 is a column for
describing ID's. An ID is identification
information given by the position information
acquiring unit 106 to a comment or a solution
and has a value which is uniformly or
definitely discriminative. Classification 402
is a column for indicating that an object to be
managed is either a comment or a solution.
Object 403 is a review object document to which
a comment or solution is post-scribed. Type
404 is a column for describing the type by
which position information is expressed and has
any value in the type 301 in the position
attribute management table 115. Attribute A
405, attribute B 406, attribute C 407,
attribute D 408, attribute E 409 and attribute
F 410 are columns described with concrete
numerical values of position information in
accordance with the type 301 in the position
attribute management table 115. Contents 411
is a column for describing concrete contents of
comments. For example, it will be appreciated
that comment information 412 having a value of
"comment A1" in the ID 401 is for applying an
"comment" to an object "Doc", has its position
information of the type "text", starts from "3"
page, "5" line and "6" column so as to be
targeted to a range of "3" page, "7" line and

"15" column and has its contents of "contents
1". In this manner, the comment can be post-
scribed into the review object document 202.
The comment post-scribed in the review object
document 202 is displayed on the review object
document editing screen 201 by using a
correlation line 204.

Referring to Fig. 5, there is shown
the flow of a process for displaying, on the
review object document editing screen 201, a
comment post-scribed in the review object
document 202 in the first embodiment of the
invention. In step 501, an input of a range of
comment postscript and comment contents is
received by means of the input unit 102. In
step 502, the position information acquiring
unit 106 specifies position information on the
basis of the position attribute management
table 115 in the resultant DB 104 and registers
(records) the specified position information in
the comment-solution management table 116 in
the resultant DB 104. More specifically, the
position information acquiring unit 106
specifies classification A 302 and
classification B 303 from the review object
document editor 219 and consults attributes in
resultant DB 104 corresponding to the specified
classification A 302 and classification B 303
to acquire position information from the review

document editor 219. In step 503, the display
processing unit 109 displays the range of
position information and the comment contents
while correlating them mutually through the
correlation line. It is to be noted that the
correlation is carried out between the two
items of position information range and comment
contents and is not limited to the one to one
relation. A plurality of comments may be
correlated to one range or conversely, one
comment may be correlated to a plurality of
ranges.

Turning now to Fig. 6, there is
illustrated an example of postscript of a
comment to the review object document 202. In
screen 601, "figure A 2" is selected in a
designated range 602. In screen 603, the
contents of a comment is filled in. A dialog
604 is opened so that the comment can be filled
in along guidance. In screen 605, the comment
contents post-scribed on the screen 603 is
displayed as comment 606 in correlation to the
comment range 602.

Reverting to Fig. 2, the comment
post-scribed to the review object document 202
is reflected upon the minutes 210. The minutes
210 is a table having columns of object 211,
position 212, comment 213, reviewer 214,
priority 215 and solution 216. Described in

the object 211 are documents to be reviewed. Described in the position 212 are ID's 401 to be managed by the comment-solution management table 116. To acquire concrete values of position information, the comment-solution management table 116 is consulted by using the ID's 401 as key. Described in the comment 213 is comment contents. Described in the reviewer 214 are names of reviewers having made the comments. Information of the name of reviewer is recorded as a possessor of the document on the review object document when the comment is post-scribed to the review object document 202. Considering the importance of a post-scribed problem, the user can describe in the priority 215 the priority order of matters to be discussed during review through the medium of the input unit 102. The minutes editing screen 209 also has a function of sorting lines in the minutes 210 by using a value of the priority 215 as key. Of course, comments can also be sorted in accordance with the sequence of their description in the review object document. Described in the solution 216 are solutions against comments discussed during review.

Referring now to Fig. 7, there is illustrated the flow of a process for reflecting the comment post-scribed to the review object document 202 upon the minutes 210.

In step 701, comments registered in
the comment-solution management table 116 are
retrieved sequentially. In step 702, position
information and comment contents of a comment
retrieved in the step 701 are acquired from the
comment-solution management table 116. In step
703, a value acquired through the steps 701 and
702 is described in a corresponding column in
the minutes 210 by means of the reflecting unit
108. In step 704, it is decided whether any
comment remains. If so, the program returns to
the step 701 but if not so, the process ends.
It is to be noted that in the minutes 210, the
reviewer 214, priority 215 and solution 216 are
not always necessary.

Reverting to Fig. 2, when a comment
described in the minutes 210 is selected on the
minutes editing screen 209, the minutes editor
220 specifies a range in review object document
202 corresponding to the selected comment and
displays it emphatically on the review object
document editing screen 201.

When a comment in the minutes 210 is
selected, a corresponding comment range in the
review object document 202 and the comment are
emphatically displayed according to a process
flow as shown in Fig. 8. In step 801, the
input unit 102 specifies a comment in the
minutes 210. In step 802, position information

is acquired from the comment-solution
management table 116 on the basis of a position
212 in minutes 210 specified in the step 801.
In step 803, a range in the review object
document 202 is specified on the basis of the
position information acquired in the step 802.
In step 804, the range specified in the step
803 is emphatically displayed by means of the
display processing unit 109. Conversely to the
above, when a range in which a comment is post-
scribed to the review object document 202 is
selected on the review object document editing
screen 201, a corresponding comment described
in the minutes 210 can be specified and
emphatically displayed on the minutes editing
screen 209. With the comment range in the
review object document 202 selected, a
corresponding comment in the minutes 210 is
emphatically displayed according to a process
flow as shown in Fig. 9. In step 901, the
input unit 102 specifies a comment range in the
review object document 202. In step 902,
position information is acquired from the
comment-solution management table 116 on the
basis of the comment specified in the step 901.
In step 903, a comment in the minutes 210 is
specified on the basis of the position
information acquired in the step 902. In step
904, the range specified in the step 903 is

emphatically displayed by means of the display processing unit 109.

Reverting to Fig. 2, users hold a discussion during review on the basis of a comment described at comment 213 in the minutes 210 and record a solution, as a result of the discussion, against the comment at solution 216. The minutes editor 220 causes the comment-solution management table 116 to also record the solution described at solution 216. For example, a solution A1 having a value of ID 413 connects to an object 403 of Doc, corresponding to a comment A1 at attribute A 405 and having contents 3 at contents 411. The minutes editor 220 can display a solution described at solution 216 by making it correlated to a comment displayed on the review object document editing screen 201.

Referring now to Fig. 10, there is illustrated the flow of a process for displaying the solution described at solution 216 by correlating it to the review object composition 202. In step 1001, the search unit 107 sequentially searches solutions described in the minutes 210 in resultant DB 104. In step 1002, position information in the review object document 202 is acquired from the comment-solution management table 116. In step 1003, the comment is correlated to the solution

by means of the reflecting unit 108. In step 1004, it is decided whether any solution remains and if so, the program returns to the step 1001 but if not so, the process ends.

Reverting to Fig. 2, in connection with comments for which no solutions are settled during review, the pending issue list editor 221 records the comments as pending issues on the pending issue list 218. The users discuss the pending issues separately after review by consulting the recorded pending issues. Structurally, the pending issue list 218 adds to the minutes 210 a person 225 in charge of pending issue, a due date 226 of pending issue and a date 227 of completion of solution against pending issue. Object 219', position 220', comment 221', reviewer 222, priority 223 and solution 224 have the same meaning as the object 211, position 212, comment 213, reviewer 214, priority 215 and solution 216 in the minutes 210, respectively. After the review ends, in connection with lines in minutes 210 for which no solutions 216 are settled, values of object 219', position 220', comment 221', reviewer 222 and priority 223 are replicated with values of object 211, position 212, comment 213, reviewer 214 and priority 215, respectively, and the person 225 in charge and due date 226 are newly filled in. Then, when

solutions against the comments are settled, the solution 224 and completion date 227 are filled in. The solutions filled in the pending issue list 218 can be reflected upon the review object document 202.

Referring to Fig. 11, there is illustrated the flow of a process for reflecting the solution filled in the pending issue list 218 upon the review object document 202. In step 1101, solutions described in the pending issue list 218 are sequentially retrieved by means of the search unit 107. In step 1102, position information in the review object document 202 is acquired from the comment-solution management table 116. In step 1103, comments are correlated to solutions through correlation lines by means of the solution reflecting unit 108. In step 1104, it is decided whether any solution remains and if so, the program returns to the step 1101 but if not so, the process ends.

Reverting to Fig. 2, when a solution described in the pending issue list 218 is selected on the pending issue management editing screen 217, a corresponding range in the review object document 202 is specified and displayed emphatically on the review object document editing screen 201.

With a solution in the pending issue

list 218 selected, a corresponding comment
range in the review object document 202 and the
solution are emphatically displayed in
accordance with a process flow as shown in Fig.
12. In step 1201, the input unit 102 specifies
a solution in the pending issue list 218. In
step 1202, position information is acquired
from the comment-solution management table 116
on the basis of a position 220 in pending issue
list 218 at the specified position acquired in
the step 1201. In step 1203, a range in the
review object document 202 is specified on the
basis of the position information acquired in
the step 1202. In step 1204, the range
specified in the step 1203 is displayed
emphatically. Conversely to the above, when a
range in which a comment is post-scribed to the
review object document 202 is selected on the
review object document editing screen 201, a
corresponding solution described in the pending
issue list 218 can be specified and can be
displayed emphatically on the pending issue
management editing screen 217.

With the comment range in the review
object document 202 selected, a corresponding
solution in the pending issue list 218 is
emphatically displayed in accordance with a
process flow as shown in Fig. 13. In step 1301,
the input unit 1301 specifies a comment range

in the review object document 202. In step
1302, position information is acquired from the
comment-solution management table 116 on the
basis of the comment specified in the step 1301.
In step 1303, a solution in the pending issue
list 218 is specified on the basis of the
position information acquired in the step 1302.
In step 1304, a range specified in the step
1303 is displayed emphatically.

Reverting to Fig. 2, when a comment
described in the minutes 210 is selected on the
minutes editing screen 209, a corresponding
solution in the pending issue list is specified
and displayed emphatically on the pending issue
list editing screen 217.

Referring to Fig. 14, there is
illustrated the flow of a process for selecting
a comment in the minutes 210 and emphatically
displaying a corresponding solution for the
pending issue list. In step 1401, the input
unit 102 selects a solution in the pending
issue list 218. In step 1402, a comment for
solution 224 is specified. In step 1403, a
comment in minutes 210 corresponding to the
comment specified in the step 1402 is specified.
In step 1404, a range specified in the step
1403 is emphatically displayed.

By using means as above, a series of
work operations of comment to the review object

document 202, review, preparation of the

minutes 210 and preparation of the pending

issue list 218 can be carried out cooperatively.

In addition, since correlated information such

as information about a solution against a

comment can be displayed immediately on the

editing screen, work of correcting the review

object document 202 can be done very smoothly.

In case correction work is applied to the

review object document 202, the difference from

the state before correction must be managed.

In a second embodiment of the invention to be

described below, the difference management for

the review object document 202 will be dealt

with.

Next, the second embodiment of the

invention will be described.

Referring to Fig. 15, there is

illustrated, in block diagram form, an

apparatus according to the second embodiment of

the invention. A review support processor 1501

differs from the review support processor 101

in that an internal process by a difference

management unit 1502 is added. In addition, a

resultant DB 1504 differs from the resultant DB

104 in that a difference management table 1503

is newly added.

An example of the difference

management table 1503 is illustrated in Fig. 16.

ID 1601 represents identifiers uniformly or definitely determined in the difference management table 1503. Object document 1602 is filled in with documents subjected to the difference management. Reflection position 1603 represents newly changed positions obtained through edition of a document indicated in the object document 1602, and concrete position information is managed with the comment-solution management table 116. Reflection source contents 1604 represents contents described at reflection position 1603 before correction. For example, difference information 1605 has an ID of "1", indicating that the object document is "DocA", the information at reflection position is "text AA1" in the comment-solution management table 116 and the reflection source contents is "text A1".

A process flow of the difference management is shown in Fig. 17. In step 1701, a correction range is selected on the basis of a solution correlated to the review object document 202. In step 1702, the contents of the correction range is registered in the difference management table 1503. In step 1703, the review object document is corrected on the basis of a solution correlated to the review object document 202. In step 1704, position

information and contents in the correction range are acquired and registered in the difference management table 1503.

Referring to Fig. 18, there is illustrated the flow of reviewing procedures including comment to the review object document, review, minutes book preparation, pending issue management and reflection upon the review object document set forth so far. In step 1801, a comment is added to the review object document 202. In step 1802, the comment post-scribed in the step 1801 is reflected upon the minutes 210. In step 1803, the priority order is given to the comment in the minutes 210 to sort it. In step 1804, a review conference is actually held. At that time, a discussion is held while cooperatively displaying a comment range in the review object document 202 and the comment in the minutes 210. In step 1805, when a new comment, which has not been described in the minutes 210, is found on the way, the program returns to the step 1801 to take the steps of post-scribing the new comment in the review object document and reflecting it upon the minutes 210. In step 1806, a solution is recorded on the minutes 210. In step 1807, the solution is reflected upon the review object document 202. In step 1808, pending solution items are reflected upon the pending issue list

218. In step 1809, if a solution is settled, it is recorded on the pending issue list 218. In step 1810, the solution post-scribed in the step 1809 is reflected upon the review object document 202. In step 1811, the review object document 202 is corrected by consulting the solution reflected in the step 1810.

As described above, the reviewing procedures can be carried out by cooperating the review object document 202, minutes 210 and pending issue list 218 while using the comment and solution as key. By merely writing information in a specified document, the information can be reflected upon all correlated documents and besides correlative information can be displayed on the editing screen, with the result that efficient review can be executed. But, as far as the foregoing description is concerned, the present invention does not presuppose that there are a plurality of review object documents to which comments are post-scribed. Then, means for carrying out review efficiently will be studied which can enable many reviewers to participate in the comment and permits many comments to be discussed to thereby improve the quality of the review object document and put together comments from plural reviewers with high efficiency.

Referring to Fig. 19, there is illustrated an apparatus according to a third embodiment of the invention. A review support processor 1901 substitutes for the review support processor 101. The essential construction remains unchanged but for the purpose of collecting comments from a plurality of reviewers, position information acquiring unit 1902, searching unit 1903 and reflecting unit 1904 substitute for the position information acquiring unit 106, search unit 107 and reflecting unit 108, respectively. Individual reviewers separately post-scribe comments to the review object document 202 to provide review object documents 1905 and 1906. Comments post-scribed to the review object documents 1905 and 1906 are collected to the minutes 210.

The flow of a process for reflecting comments from plural reviewers upon the minutes 210 is illustrated in Fig. 20. In step 2001, review object documents applied with comments are designated sequentially. The review object documents applied with comments to be designated at that time may exist in an external storage connected through a network. In step 2002, the comments post-scribed in the review object documents are acquired sequentially. In step 2003, the position

information acquiring unit 1502 specifies

position information on the basis of the

position attribute management table 115 and

registers the specified position information in

the comment-solution management table 116. In

step 2004, values acquired through the steps

2002 and 2003 are described in the minutes 210.

In step 2005, it is decided whether any

unprocessed comments remain and if so, the

program returns to the step 2002 but if not so,

the program proceeds to step 2006. In the step

2006, it is decided whether any unprocessed

review object documents remain and if so, the

program returns to the step 2001 but if not so,

the process ends. In the above, comments from

the plurality of reviewers are reflected upon

the minutes 210 but the reflected comments can

also be reflected upon the review object

document 202 through the same process as the

process flow for reflection of solutions as

shown in Fig. 10.

An example of merging comments from

the plurality of reviewers to the review object

document 202 is illustrated in Fig. 21. In a

review object document 2101 applied with

comments, a comment 2105 is post-scribed in a

comment range 2104 and a comment 2107 is post-

scribed in a comment range 2106. Similarly, in

a review object document 2102 applied with

comments, a comment 2108 is post-scribed in a comment range 2106 and a comment 2110 is post-scribed in a comment 2109. These comments are merged into a review object document 2103. The comment ranges 2104, 2106 and 2109 are put together in the review object document 2103 and the comments 2105, 2107, 2108 and 2110 are correlated to these comment ranges. The comments 2107 and 2108 are correlated to the same comment range 2106.

As described above, for the benefit of a plurality of viewers, too, a series of work operations in review can be supported. The foregoing embodiments, however, presuppose that the review support processor 101 and review object document editor 219 operate on a single computer, failing to cause, for example, a computer A to edit the review object document and a computer B to operate the minutes. Accordingly, it is impossible for a reviewer staying at a remote location to participate in reviewing through a television conference, for instance. Then, operating the present invention on a plurality of computers will be studied.

Referring to Fig. 22, an apparatus according to a fourth embodiment of the invention is illustrated. A review support processor 2201 substitutes for the review

support processor 1901. For transmission of information among computers, input processing unit 2202 and reflecting unit 2203 substitute for the input processing unit 105 and reflecting unit 1904, respectively. Further, transmission of information to another computer is carried out through a connection unit 2204. In Fig. 22, the apparatus is connected to a processor 2208 on a different computer through a connection unit 2207. The connection unit is connectable to plural computers. Further, in Fig. 22, the review object document editor 219 cooperates with the processor 100 and the minutes editor 220 cooperates with the processor 2208. The connection unit 2204 is comprised of an instruction generator 2205 and an instruction analyzer 2206. The processors cooperate with each other by interchanging instructions.

An instruction 2301 is structured as shown in Fig. 23. Described in instruction classification 2302 is "reflection" or "display". Described in position information 2303 is position information for instructions, concrete values of which are managed by the comment-solution management table 116. Reflection destination 2304 represents a processor which executes the instruction 2301. Reflection classification 2305 indicates which

subsystem the instruction is destined for.

An example of an instruction 2401 is shown in Fig. 24. In the instruction 2401, "display" is indicated at instruction classification 2402, "comment A1" is indicated at position information 2403, "apparatus A" is indicated at reflection destination 2404 and "minutes" is indicated at reflection classification 2405. In other words, the instruction has such a meaning as "In connection with a minutes edition system operating in the apparatus A, display infor-mation corresponding to a position of the comment A1". The flow of a process for generating the instruction 2401 is shown in Fig. 25. In step 2501, the class of display or reflection is determined. In step 2502, the position information, reflection destination and reflection classification are acquired from the reflecting unit 2203. In step 2503, an instruction is generated from the information acquired in the step 2502. In step 2504, the instruction generated in the step 2503 is transmitted to the reflection destination. The flow of a process for analyzing the instruction 2401 is shown in Fig. 26. In step 2601, the input processing unit 2202 receives the instruction. In step 2602, the instruction classification, position information and reflection classification are

analyzed from the instruction acquired in the step 2601. In step 2603, the instruction is executed.

According to the present embodiment, through the execution of the instruction, the comments post-scribed to the review object document are fetched into the minutes edition system and formatted into a table form. In the review conference, a discussion is proceeded with in accordance with the table and solutions are filled in. In case the contents of the review object document is desired to be confirmed during the review conference, the comment in the table is selected, so that a corresponding comment site can be emphatically displayed on the review object document edition system driven individually. Further, a comment newly generated during the review can be described in the review object document edition system so as to be reflected upon the minutes edition system on real time base. A comment for which any conclusion is not made during the review conference is automatically reflected upon the pending issue management system. Thereafter, when an item for which a solution is settled is described in the pending issue management system, the solution is reflected upon the corresponding site in the review object document. Accordingly, the object

document can be reviewed on real time base.
Further, by merely inputting the comment and
solution directly to a single object system,
the information can be reflected upon
correlated systems and therefore, work of mail
notification, for example, is not required. In
addition, by cooperating with a system for
editing the review object document, minutes and
pending issue management through a network, the
review can be executed on real time base even
among reviewers staying at distributed
locations.

According to the foregoing
embodiments of the invention, systems for
review object document, minutes preparation and
pending issue management can be operated
cooperatively. Information on the comment and
solution can also be reflected upon inter-
systems and can be displayed cooperatively.
Also, comments from a plurality of reviewers
can be merged. In addition, the cooperative
process can be carried out even on a plurality
of computers connected mutually. Through this,
advantages in the following (A) to (D) can be
expected.

(A) A series of work operations such
as review, minutes preparation, pending issue
list preparation and correction of the review
object document can be carried out efficiently.

(B) Review by a plurality of reviewers at remote locations can be permitted.

(C) Even information of a different system correlated to review can be displayed and acquired immediately and hence efficient review can be executed.

(D) Omission of reflection of the comment and solution can be prevented and therefore, the improved quality of the review object document can be expected.

It should be further understood by those skilled in the art that although the foregoing description has been made on embodiments of the invention, the invention is not limited thereto and various changes and modifications may be made without departing from the spirit of the invention and the scope of the appended claims.